

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION
RESEARCH AND TECHNOLOGY RESUME

TITLE

Passive Microwave Remote Sensing of Asteroids Using the VLA

PERFORMING ORGANIZATION

Geophysics Branch (Code 622)
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DESCRIPTION (a. Brief statement on strategy of investigation; b. Progress and accomplishments of prior year; c. What will be accomplished this year, as well as how and why; and d. Summary bibliography)

a. Precise flux density measurements made with the Very Large Array (VLA) of the National Radio Astronomy Observatory will be used to define the microwave continuum spectra of asteroids. These spectra will be inverted in order to estimate the near-surface bulk properties (radii, roughness, composition) independent of previous optical or infrared spectroscopy.

b. The results on 15 Eunomia and 704 Interamnia have been published. The paper on 1 Ceres has been published in the AJ. A paper on the simple models of asteroid radio spectra has been published in the Publications of the Astronomical Society of the Pacific. Preliminary analyses of 2 Pallas, 4 Vesta and 10 Hygeia have been completed. A review chapter for Asteroid II has been drafted.

c. High spatial resolution 2 cm observations of 1 Ceres and 2 Pallas will again be attempted. Previous data have been unsuitable for highest resolution mapping due to adverse weather conditions. 20 cm observations will be attained for 2 Pallas and 4 Vesta. If the new cooled 3.3 mm receiver is available for the 12 m Kitt Peak antenna, we will attempt observations of 15 Eunomia and 704 Interamnia. The results for 2 Pallas, 4 Vesta and 10 Hygeia will be submitted for publication. The review chapter will be published and the results on Asteroid photometric diameters will be published.

d. Summary Bibliography:

Webster, W.J., Jr., Hobbs, R.W. and Lowman, P.D., Jr. (1984), Detection of
-2 cm Emission from Minor Planet 15 Eunomia, Icarus, 60, 538.

Webster, W.J., Jr., Hobbs, R.W. and Lowman, P.D., Jr. (1987), Detection of - 2 cm
Emission from Minor Planet 704 Interamnia, Icarus, 69, 29.

Webster, W.J., Jr. (1987, On the Simple Models for the Interpretation of Centimeter-
Wavelength Radio Observations of Asteroids, PASP, 99, 1009.

Webster, W.J., Jr., Johnston, K.J., Hobbs, R.W., Wade, C.M., Lowman, P.D., Jr., and
Seidleman, P.K. (1988), The microwave spectrum of Asteroid 1 Ceres, Astronomical
Journal, 95, 1263.

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